Knowledge Management at JPL

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JPL's Knowledge Management Defined

- Process of making relevant information available quickly and easily for people to use productively
- KM addresses
  - Reuse and sharing
  - Creation
  - Relevance as determined by the customer
  - Training and awareness
  - Customer identification and focus
  - Funding

JPL's Knowledge Architecture

- The Knowledge Architecture addresses
  - Services
  - Processes
  - Systems

- Implementation focuses on initiatives that address service and system architecture

- KM Program started in April 1999
  - JPL implementation is relatively broad
  - Three components of the architecture will be deployed across NASA with CIO seed money

KM Architecture Cornerstones

- Build only what is necessary to complete a capability

- Standardize only what's necessary to hold things together

- Provide institutional support for institutional services

  - Interoperability, professional service base, migration tools, application support, training, and application refreshment

KM System Architecture

- To provide access to knowledge *and* security and integrity of that knowledge

- Information system architecture

  - User interface

  - KM functions

  - Application infrastructure services

  - Knowledge resources

  - Infrastructure services

JPL

Portals
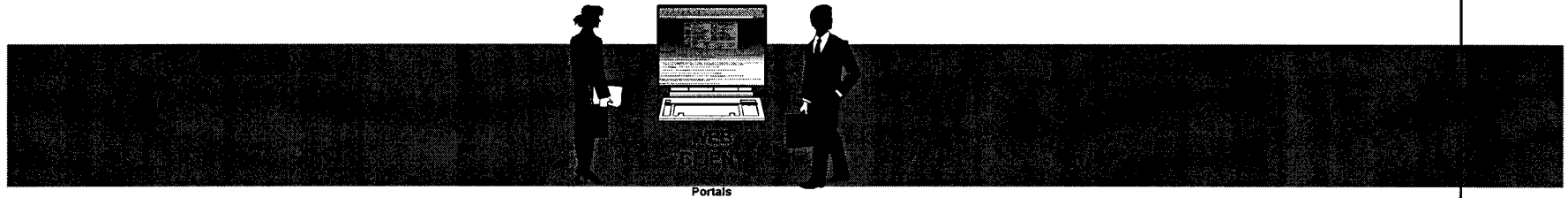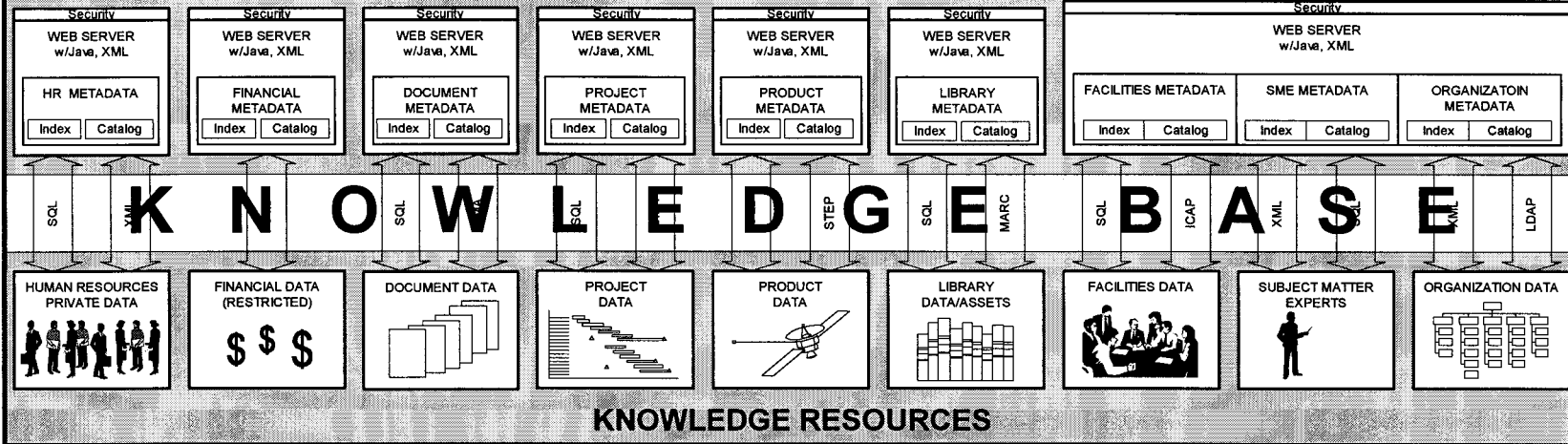
"What do you want to do?"　　　"Who are you?"　　　"How do you want it?"

KNOWLEDGE MANAGEMENT FUNCTIONS

Search, Browse, Retrieve, Create, Add Value (metadata), Update, Archive, Index, Filter, Catalog, Analyze, Validate, Associate

APPLICATION INFRASTRUCTURE SERVICES

Security	Security	Security	Security	Security	Security	Security
WEB SERVER w/Java, XML	WEB SERVER w/Java, XML	WEB SERVER w/Java, XML	WEB SERVER w/Java, XML	WEB SERVER w/Java, XML	WEB SERVER w/Java, XML	WEB SERVER w/Java, XML
HR METADATA	FINANCIAL METADATA	DOCUMENT METADATA	PROJECT METADATA	PRODUCT METADATA	LIBRARY METADATA	FACILITIES METADATA / SME METADATA / ORGANIZATOIN METADATA
Index Catalog	Index Catalog	Index Catalog	Index Catalog	Index Catalog	Index Catalog	Index Catalog / Index Catalog / Index Catalog

K N O W L E D G E B A S E

SQL XML SQL SQL STEP SQL MARC SQL ICAP XML SQL XML LDAP

HUMAN RESOURCES PRIVATE DATA	FINANCIAL DATA (RESTRICTED)	DOCUMENT DATA	PROJECT DATA	PRODUCT DATA	LIBRARY DATA/ASSETS	FACILITIES DATA	SUBJECT MATTER EXPERTS	ORGANIZATION DATA
	$ $ $							

KNOWLEDGE RESOURCES

INFRASTRUCTURE SERVICES

Security, Networks, File Service, Database Service, Messaging

km_bldg_blocks_03 1998.12.05

Focus of the Initiatives

- Focus on four areas aligned with processes
  - Helping people *capture* key knowledge for reuse (creating a knowledge-sharing culture)
  - Helping people work together to *develop* knowledge (individual and group support)
  - Helping people *organize* and catalog knowledge
  - Helping people *distribute* and find knowledge
  - Infrastructure to make this work

Capturing Knowledge

- Helping people articulate knowledge that can be easily shared and reused

- Supporting people in moving tacit knowledge to explicit knowledge
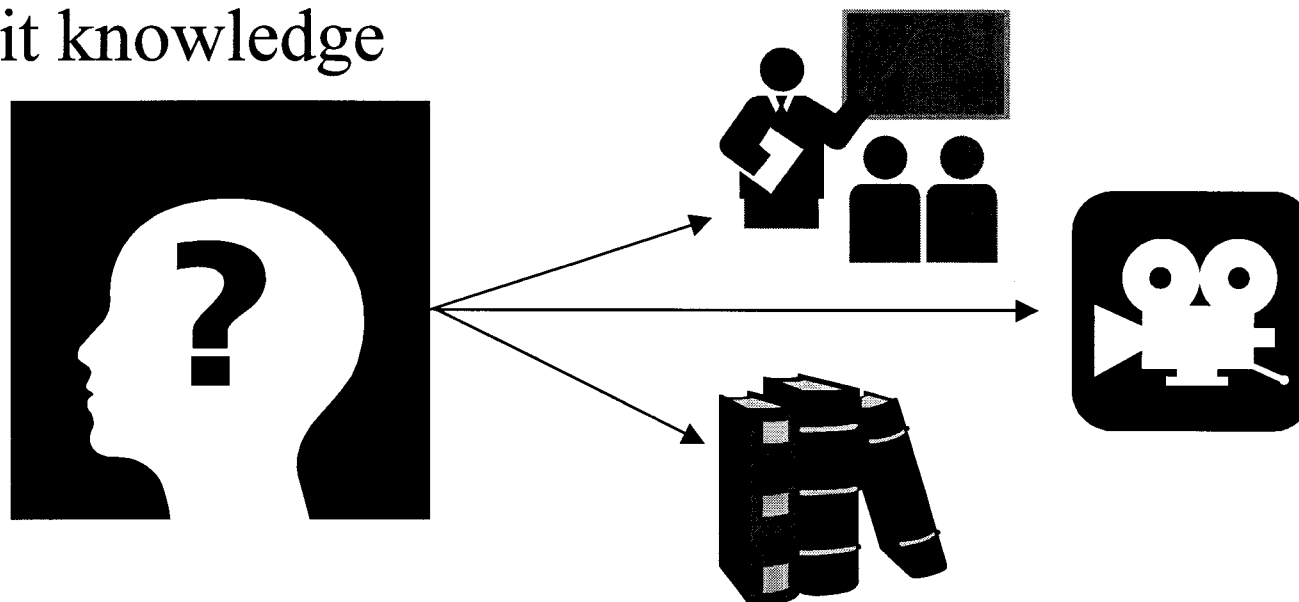
Capturing Knowledge

- ## Knowledge Creation Studies

  - Improve the quality, methods, and rate of capturing the knowledge created at and for JPL

  - Understand and benchmark with industry and academia to find best practices in encouraging and rewarding people to create and share knowledge

  - Provide incentives for sharing knowledge

Developing Knowledge

- Helping people develop communities of practice and find people with solutions

- Creating meeting "spaces" for people to get together regardless of location or time synchronicity

Developing Knowledge

- **Expert Connections**
  - Help people locate in-house or outside experts needed for JPL tasks
    - Online directory of experts with fields of expertise, sample documents, and contact information
    - Easy to update and expand
    - Future plans to add linkages to electronic knowledge resources and publications
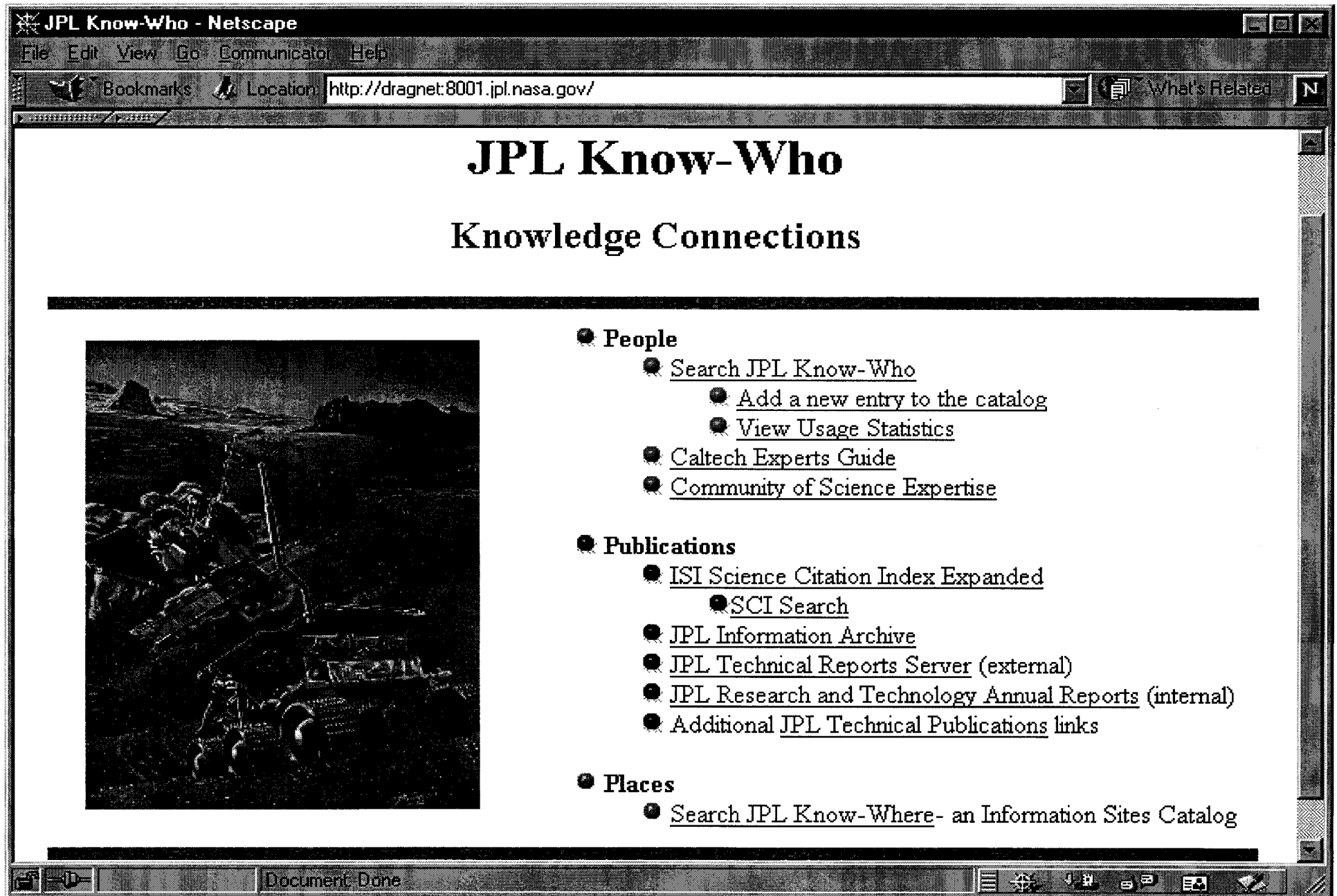
JPL Know-Who Inventory - Netscape

File   Edit   View   Go   Communicator   Help

Bookmarks   Location: ragnet:8001.jpl.nasa.gov/WC-bin/layout.pl?skills:SK000778:inv/skills/chahine.moustafa.t.lbl   What's Related   N

[Current Work | Key Skill | Name | Nontechnical Category Name [Organization Number | Technical Category Name |
Website Name | Web Server Name [X500 Name]

JPL Know-Who

Moustafa T Chahine

If you are Moustafa T Chahine, you can Update this information.

|	
Technical Category Name	Science: Atmospheres
Nontechnical Category Name	Administrative
Key Skills	Director's Research and Discretionary Fund (DRDF)
Websites	http://ood.jpl.nasa.gov/bios/chahine.html

Document: Done

Developing Knowledge (continued)

- ## Collaborative Environment
  - – Improve meeting collaboration and knowledge sharing with foreign and domestic partners
    - Integrated voice- and dataconferencing
    - Create virtual teaming environments for global communities of practice, for example,
      - – Planetary geologists
      - – Exobiologists
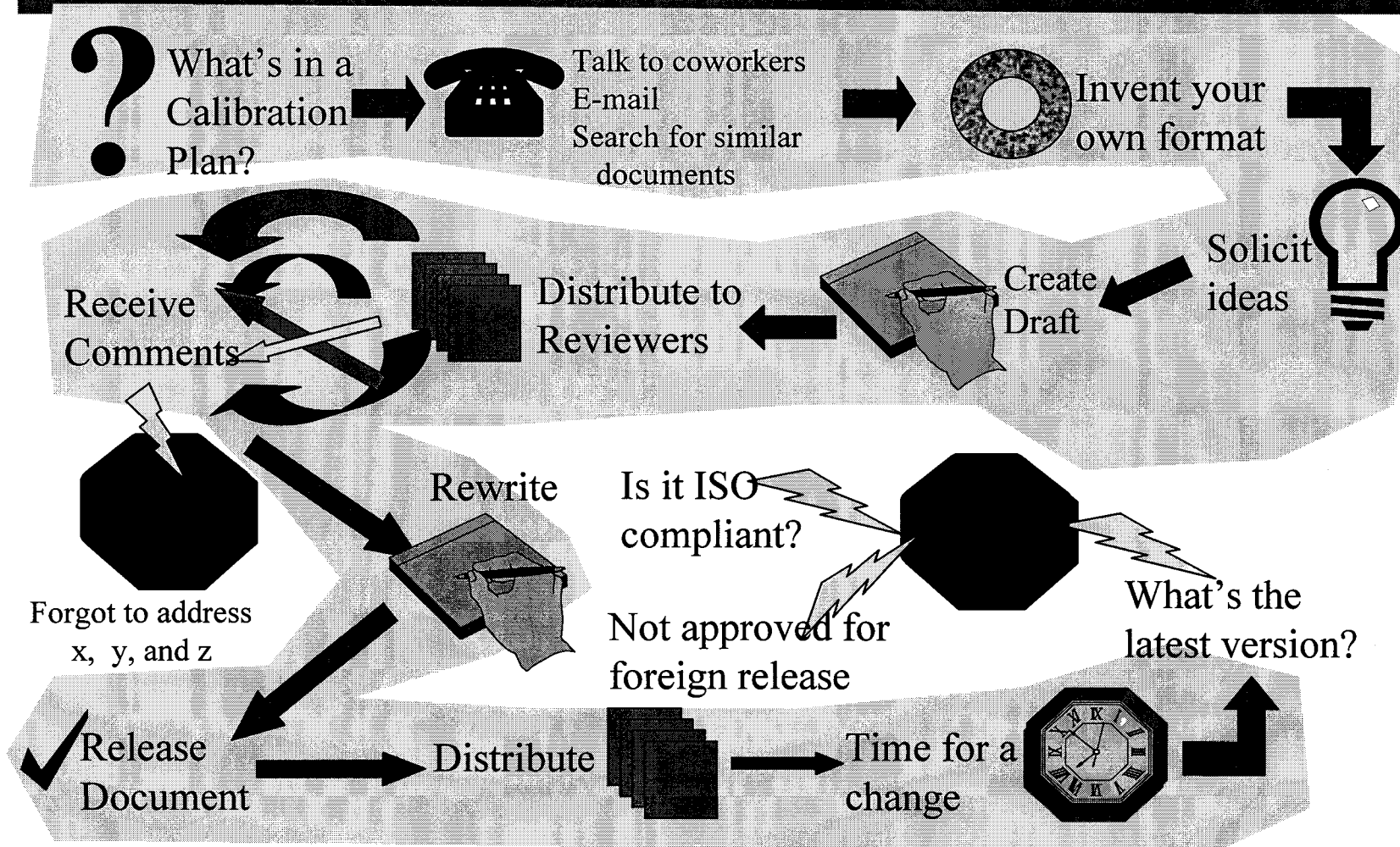   - – Solar propulsion
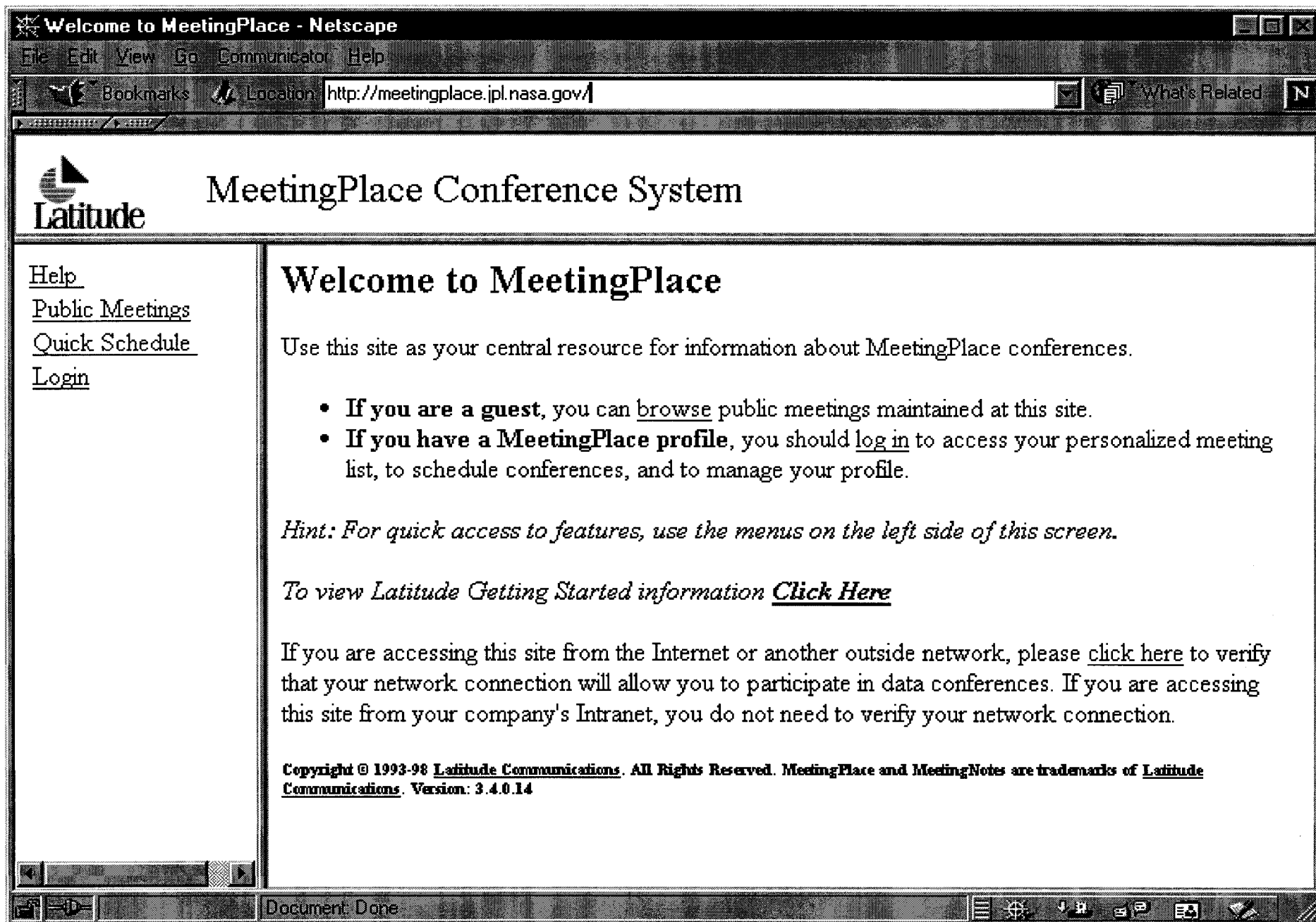
Organizing Knowledge

- Organize and select most useful information so people can easily share, find, and use it

- Structure information for use and reuse

- Filter contributions to knowledge base so critical lessons are marked for easy retrieval

- Embed the rules in the tools
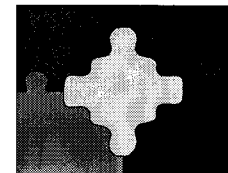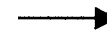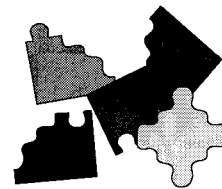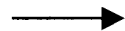
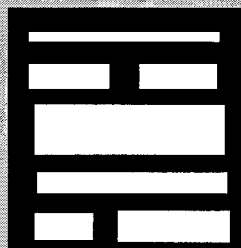## Organizing Knowledge (continued)

- **Documentation Management**
  - Reduce cost and schedule to complete required documentation
  - Enable documents and drawings to be shared across systems by providing conversion tools
    - Templates and document trees with format and content
    - Secure, interoperable Project Libraries
    - Electronic archive for access to all information produced at or for JPL, or subscribed to by JPL
    - Provide centralized transfer of inactive and end-of-project records requiring archive

Authoring a Report Today

What's in a Calibration Plan? → Talk to coworkers
E-mail
Search for similar documents → Invent your own format

Solicit ideas

Receive Comments ← Distribute to Reviewers ← Create Draft

Rewrite

Is it ISO compliant?

Forgot to address x, y, and z

Not approved for foreign release

What's the latest version?

Release Document → Distribute → Time for a change

Document Management Tomorrow

? What's in a Calibration Plan?

Template with all required areas

Subject Matter Experts to help

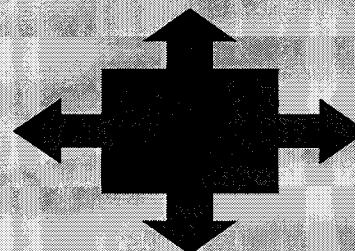Good Examples

✓ Review and Release

Collaboration tools

ISO, 7120.5A, etc. Compliance
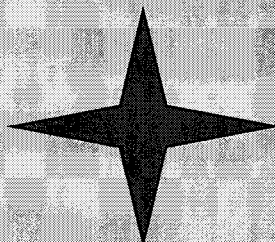
Rules & Regulations

Routing and Distribution

Organizing Knowledge (continued)

- ## Project Web Sites

  - Improve knowledge sharing internal to projects by creating standards for project Web sites

  - Enable projects to create customized Web sites within one week from project start

  - Provide support for recommended tools, standards, metadata tags, and formats
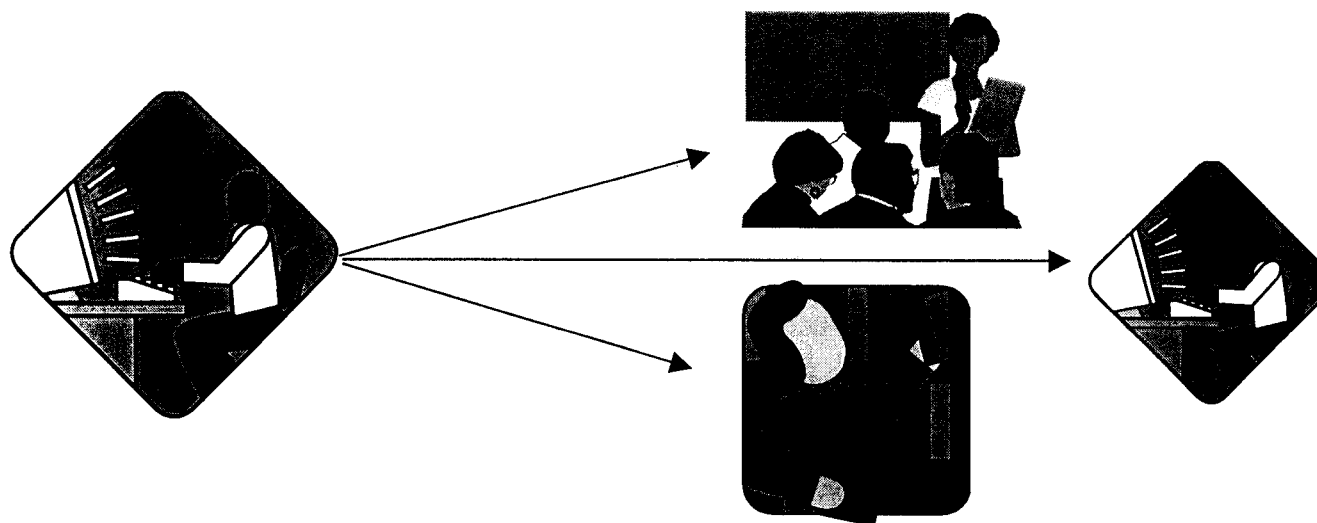
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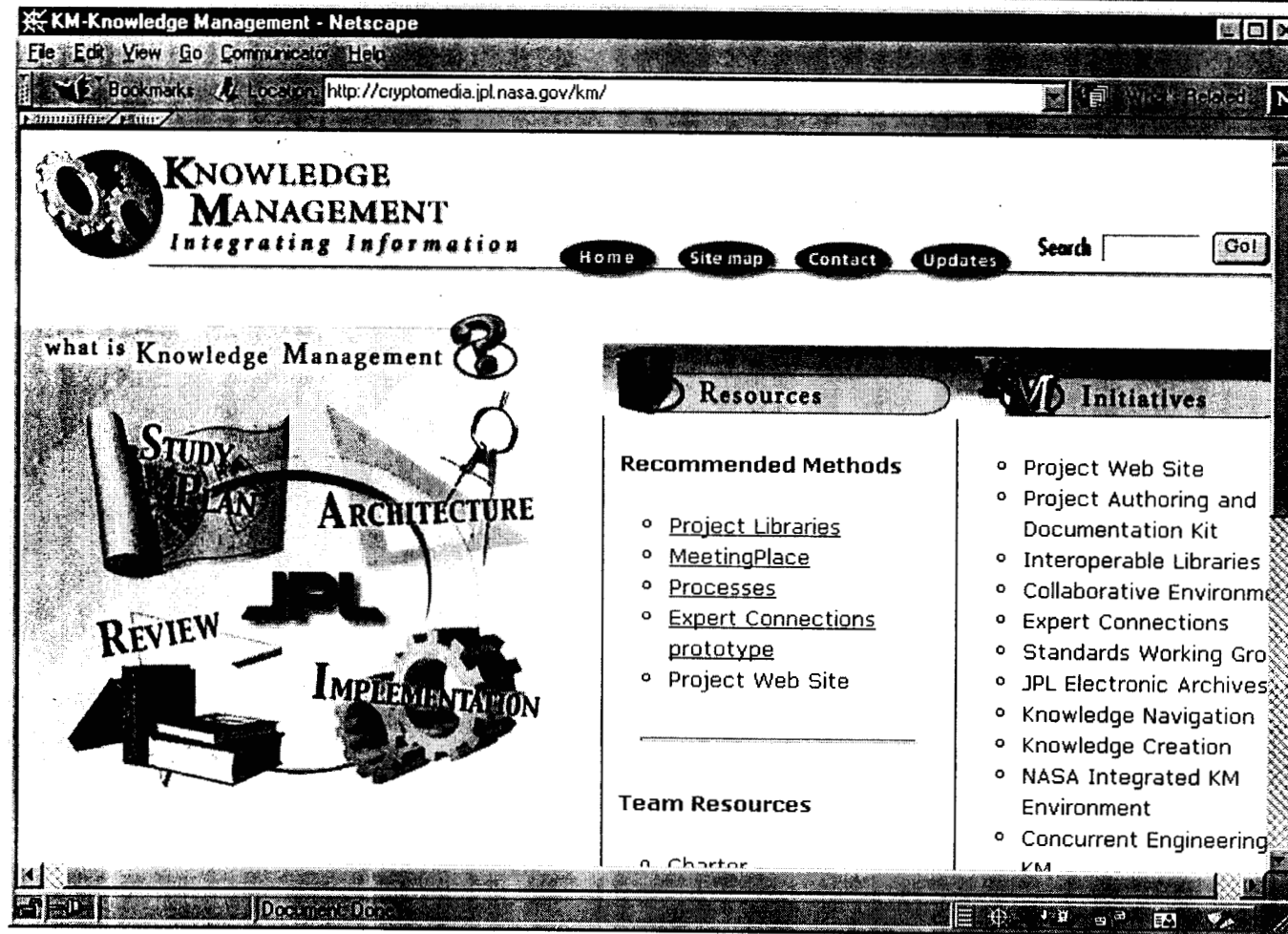
Distributing Knowledge

- Helping people get access to knowledge

- Encouraging people to use and reuse knowledge

- Training people in how to use the knowledge management tools

- # Knowledge Navigation

  - Create a customizable Web gateway to JPL's knowledge resources

    - Integrates portals into many JPL knowledge spaces
    - Searching across *all* JPL knowledge from one place

- # Scientist/Research Services

  - Design and integrate expert research services into the early phases of new projects and proposals to extend core JPL knowledge centers (e.g., Centers of Excellence)
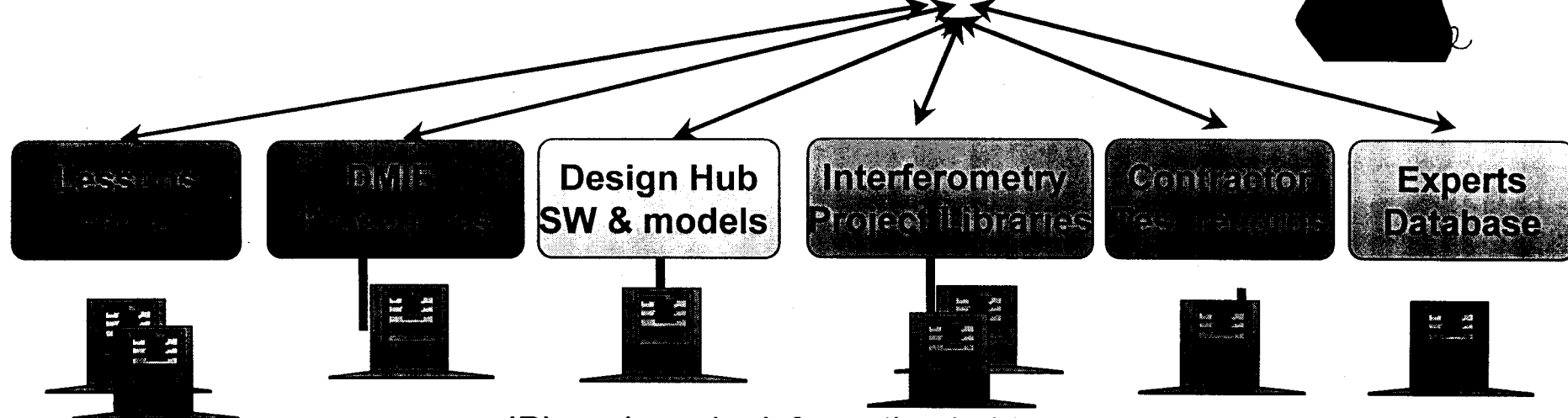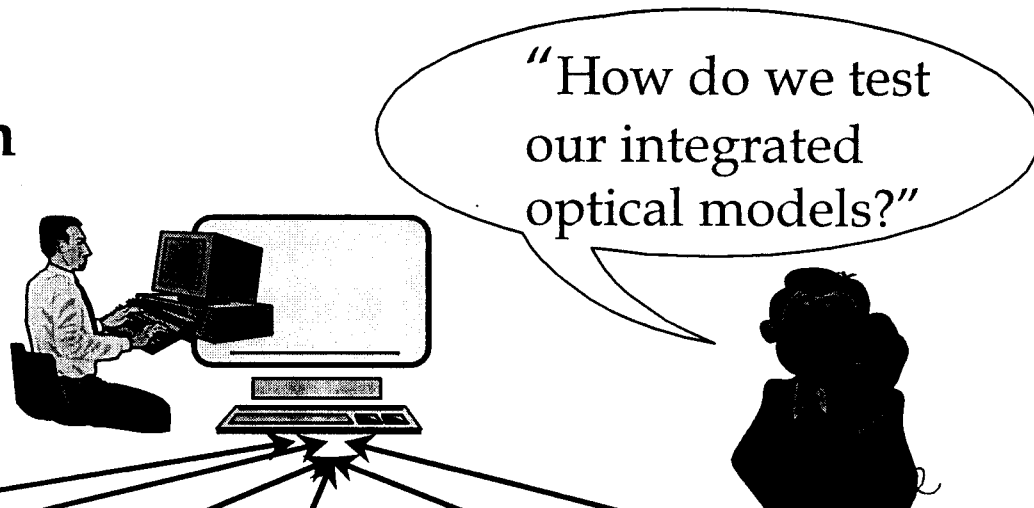
Navigation Today

"Portal" to information anywhere in the enterprise

"How do we test our integrated optical models?"

| | | Design Hub SW & models | Interferometry Project Libraries | Contractor | Experts Database |
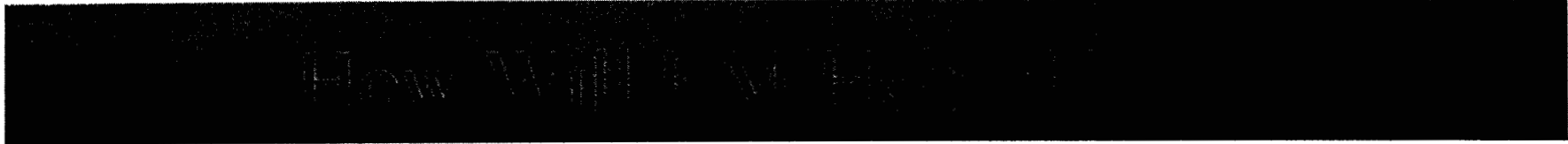
JPL and vendor information holdings

Components Supporting KM

- ## Standards Working Group
  - Assure JPL meets or exceeds NASA, industry, and academia standards for KM processes and technologies
    - Serve on NASA standards committees
    - Develop core metadata and interoperability standards

- ## Enterprise Data Architecture
  - Integrated data models and integration of information across the Laboratory

How Will It Work

- As the KM initiatives deliver products that support projects, the way JPL employees work will change over time
  - Changes will generally be incremental
  - Products will be coordinated across the various initiatives and with other processes, products, and services at JPL and NASA
  - Services are charged back as soon as they are operational

KM Services and JPL

- Find JPL experts listed in a directory
- Replicate and use a project web site and Project Library with embedded security, standards, and easy maintenance
- Have integrated voice- and dataconferencing with all team members
- Piloted method for moving electronic records of projects to long-term archive
  - Recognition of records retention and ITAR issues

- Utilize instructions, templates, and tools for developing and maintaining project information

- Use *one* Web-based tool and workflow for creating documents, policies, and procedures

- Have a simple form for publishing knowledge (integrates metadata standards, security, and business rules)

- Search across Lab resources from JPL portal

KM at NASA in September

- Designed, developed, and tested methods and tools for proof of concept of a *Federated Knowledge Management Architecture*
  - Quickly find science and engineering experts across the Agency
    - Goddard's *Experts Directory Service*
  - Give customized views into NASA resources
    - JPL's *Knowledge Navigation*
  - Create and maintain a knowledge resource that people publish to and retrieve knowledge from
    - Langley's *Lessons Learned Information System*